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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,724	03/21/2001	Charles E. Larson	4360US (99-890)	3328

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TRASK BRITT
P.O. BOX 2550
SALT LAKE CITY, UT 84110

EXAMINER

TOLEDO, FERNANDO L

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 06/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/813,724

Applicant(s)

LARSON, CHARLES E.

Examiner

Fernando Toledo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 16 – 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. (U. S. patent 6,444,921 B1).

In re claim 16, Wang in the U. S. patent 6,444,921 B1; figures 1 – 20B discloses providing a substrate 5; providing a flexible interposer 30 including a first surface having several electrical contacts 14 and 24 for electrically connecting at least one semiconductor die to a substrate, a second surface and several of vias extending completely through the flexible interposer from the first surface to the second surface (Figure 3); providing at least one semiconductor die having several of bond pads on a first surface thereof; attaching the at least one semiconductor die to the flexible interposer forming an intermediate structure, the interposer being folded around the at least one semiconductor die, the at least one semiconductor die being in electrical

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communication with the substrate through the flexible interposer; and attaching the intermediate structure to the substrate (Figure 1).

3. In re claim 17, Wang teaches wherein the vias are filled with conductive metal (column 5).

4. In re claim 18, Wang teaches wherein the second surface surrounds at least three sides of the at least one semiconductor die around which said interposer is folded (Figure 1).

5. In re claim 19, Wang teaches wherein the second surface of the interposer surrounds at least two sides of the at least one semiconductor die around which the interposer is folded (Figure 1).

6. In re claim 20, Wang teaches wherein the bond pads are in electrical communication with the electrical contacts through the vias in the flexible interposer (Figure 1).

7. In re claim 21, Wang teaches wherein the interposer folds around more than two semiconductor die in a serpentine fashion around groups including at most two semiconductor dies therein (Figure 1).

8. In re claim 22, Wang teaches further including applying electrical contacts to top surface of the high density semiconductor package to attach semiconductor devices to the package (Figure 1).

9. In re claim 23, Wang teaches providing at least one semiconductor die having several of bond pads on a surface of the at least one die; providing an interposer including a first surface having several of electrical contacts, a second surface, and several of vias extending completely through the interposer from the first surface to the

second surface; attaching the at least one die to the interposer to form an intermediate packaging structure; providing a substrate; attaching the substrate to the intermediate structure; and connecting between the substrate and the at least one semiconductor die (Figure 1).

10. In re claim 24, Wang discloses wherein the attaching the at least one die further includes: attaching multiple semiconductor die in groups of two semiconductor die, the semiconductor die having a back-to-back configuration, a back side of one semiconductor die substantially contacting a back side of another semiconductor die of a group (Figure 1).

11. In re claim 25, Wang discloses wherein the electrical contacts and the bond pads provide electrical communication through the vias of the flexible interposer (Figure 1).

12. In re claim 26, Wang discloses forming electrical contacts on a top surface of the package to attach semiconductor device components (Figure 1).

Response to Arguments

13. Applicant's arguments filed 12 March 2003 have been fully considered but they are not persuasive for the following reasons.

14. Applicant contests that Wang does not show wherein the vias completely go through the flexible interposer.

Examiner respectfully submits that Wang teaches that one or more bypass capacitors may be formed on the surface of substrate 12 and/or substrate 20 with connections made to it from conductive layers 33 and 37 (Column 6, Lines 17 – 26). Hence although the embodiment of Wang does not disclose the vias being formed to go

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completely through the interposer layer, Wang discloses that this could be possible in an alternate embodiment.

15. Applicant contests that Wang does not describe “said at least one die being in electrical contact communication with the substrate through the flexible interposer”.

Examiner respectfully submits that by forming the bypass capacitors explained above that are electrically connected to the substrate and the flexible interposer, which are in turn electrically connected to the at least one die.

16. Applicant contests that the flexible interposer does not surround the die on at least three sides.

Examiner respectfully submits that Wang teaches that capacitors can be formed on the substrates 12 and 20 and the flexible interposer surround on at least three sides the substrates 12 and 20, hence the limitation has been met.

17. Applicant contests that Wang does not teach the element of the claimed invention calling for “applying electrical contacts to a top surface of a high density semiconductor package to attach semiconductor devices to said package.”

Examiner respectfully submits that Wang teaches as an example that component 5 may be attached to a semiconductor chip, which would inherently need electrical contacts. (Column 8, Lines 4 – 13).

18. Applicant’s amendments and arguments have not overcome the rejection.

Conclusion

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

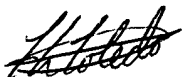
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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

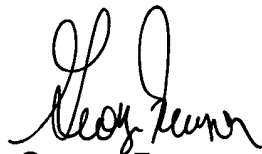
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando Toledo whose telephone number is 703-305-0567. The examiner can normally be reached on Mon-Fri 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7382 for regular communications and 703-308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



FToledo
May 29, 2003



George Fourson
Primary Examiner
Art Unit 2823